SRNT 4/29/05

10816945 METHOD OF MEASURING HIGH TEMPERATURES AND INSTRUMENT THEREFORE

Type	L#	Hits	Search Text	DBs	Time Stamp	Comments
BRS	L1	20448	Fuel adj cell$1	US-PGPUB; USPAT	4/29/05 12:38	
BRS	L2	436	autothermal adj reformer	US-PGPUB; USPAT	4/29/05 12:39	
BRS	L3	2385	syngas	US-PGPUB; USPAT	4/29/05 12:58	
BRS	L4	698	catalytic adj partial adj oxidation	US-PGPUB; USPAT	4/29/05 12:59	
BRS	L5	17554	endotherm$2	US-PGPUB; USPAT	4/29/05 12:59	
BRS	L6	297	4 and 5	US-PGPUB; USPAT	4/29/05 12:59	
BRS	L7	51	2 and 4 and 5	US-PGPUB; USPAT	4/29/05 13:00	
BRS	L8	18	2 and 3 and 4 and 5	US-PGPUB; USPAT	4/29/05 13:00	see below
BRS	L9	6	1 and 2 and 3 and 4 and 5	US-PGPUB; USPAT	4/29/05 13:00	browsed
BRS	L10	12	8 not 9	US-PGPUB; USPAT	4/29/05 13:34	browsed
BRS	L11	2791251	probe sheath well thermowell	US-PGPUB; USPAT	4/29/05 13:39	
BRS	L12	249	6 and 11 not 8 not 9	US-PGPUB; USPAT	4/29/05 13:36	
IS&R	L13	4151	(422/105-120).CCLS.	US-PGPUB; USPAT	4/29/05 13:36	
IS&R	L14	2852	("518").CLAS.	US-PGPUB; USPAT	4/29/05 13:37	
IS&R	L15	6528	(48/61-127.9).CCLS.	US-PGPUB; USPAT	4/29/05 13:37	
IS&R	L16	581	(48/198.1-198.7).CCLS.	US-PGPUB; USPAT	4/29/05 13:39	
BRS	L17	2280	thermowell	US-PGPUB; USPAT	4/29/05 13:39	
BRS	L18	0	17 and 12	US-PGPUB; USPAT	4/29/05 13:39	
BRS	L21	15	17 and 14	US-PGPUB; USPAT	4/29/05 14:25	see below
BRS	L22	4	17 and 15	US-PGPUB; USPAT	4/29/05 13:42	browsed
BRS	L20	4	17 and 16	US-PGPUB; USPAT	4/29/05 13:56	browsed
IS&R	L23	1	("3417029").PN.	US-PGPUB; USPAT	4/29/05 14:01	mentioned in one of above
BRS	L19	7	17 and 13	US-PGPUB; USPAT	4/29/05 14:04	browsed
BRS	L24	13	17 and 14 not 15 not 16 not 13 not 9 not 8	US-PGPUB; USPAT	4/29/05 14:31	browsed
IS&R	L25	1	("4,616,705").PN.	US-PGPUB; USPAT	4/29/05 14:31	na
BRS	L26	61	(US-20010002201-$ or US-20010024464-$ or US-20010046253-$ or US-20010055560-$ or US-20020044590-$ or US-20020159500-$ or US-20020182119-$ or US-20030016730-$ or US-20030174756-$ or US-20030208960-$ or US-20040208229-$ or US-20040020124-$ or US-20030211025-$ or US-20010047040-$ or US-20030162846-$ or US-20030172590-$).did. or (US-2383729-$ or US-3580078-$ or US-3891467-$ or US-3913058-$ or US-4311671-$ or US-4438649-$ or US-4614443-$ or US-4848927-$ or US-4925638-$ or US-5005986-$ or US-5143647-$ or US-5160456-$ or US-5192132-$ or US-5232517-$ or US-5242226-$ or US-5245100-$ or US-5427452-$ or US-5595719-$ or US-5718512-$ or US-5775807-$ or US-6059453-$ or US-6302578-$ or US-6453889-$ or US-6576158-$ or US-6599011-$ or US-6277894-$).did. or (US-5752995-$ or US-3417029-$ or US-6001243-$ or US-5858311-$ or US-5081039-$ or US-4822570-$ or US-3969078-$ or US-3741713-$ or US-6034141-$ or US-4714692-$ or US-4510264-$ or US-4423155-$ or US-4237063-$ or US-4157338-$).did. or (US-2383729-$).did. or (JP-2004317516-$).did. or (DE-3613501-$ or WO-9202794-$ or EP-1469291-$).did.	US-PGPUB; USPAT; USOCR; JPO; DERWENT	4/29/05 14:43	tagged so far.
BRS	L27	6	(process adj stream) and 26	US-PGPUB; USPAT	4/29/05 14:44	browsed

10816945 METHOD OF MEASURING HIGH TEMPERATURES AND INSTRUMENT THEREFORE

Type	L#	Hits	Search Text	DBs	Time Stamp	Comments
IS&R	L1	921	(422/190).CCLS.	US-PGPUB; USPAT	4/29/05 16:26	catalyst...
IS&R	L2	1576	(422/211).CCLS.	US-PGPUB; USPAT	4/29/05 16:26	catalyst...
IS&R	L3	559	(422/109).CCLS.	US-PGPUB; USPAT	4/29/05 16:26	for temperature control
BRS	L4	61	(US-20010002201-$ or US-20010024464-$ or US-20010046253-$ or US-20010047040 $ or US-20010055560-$ or US-20020044590-$ or US-20020159500-$ or US-20020182119-$ or US-20030016730-$ or US-20030162846-$ or US-20030172590-$ or US-20030174756-$ or US-20030208960-$ or US-20030211025-$ or US-20040020124-$ or US-20040208229-$).did. or (US-2383729-$ or US-3417029-$ or US-3580078-$ or US-3741713-$ or US-3891467-$ or US-3913058-$ or US-3969078-$ or US-4157338-$ or US-4237063-$ or US-4311671-$ or US-4423155-$ or US-4438649-$ or US-4510264-$ or US-4614443-$ or US-4714692-$ or US-4822570-$ or US-4848927-$ or US-4925638-$ or US-5005986-$ or US-5081039-$ or US-5143647-$ or US-5160456-$ or US-5192132-$ or US-5232517-$ or US-5242226-$ or US-5245100-$).did. or (US-5427452-$ or US-5595719-$ or US-5718512-$ or US-5752995-$ or US-5775807-$ or US-5858311-$ or US-6001243-$ or US-6034141-$ or US-6059453-$ or US-6277894-$ or US-6302578-$ or US-6453889-$ or US-6576158-$ or US-6599011-$).did. or (US-2383729-$).did. or (JP-2004317516-$).did. or (DE-3613501-$ or WO-9202794-$ or EP-1469291-$).did.	US-PGPUB; USPAT; USOCR; JPO; DERWENT	4/29/05 16:27	previously tagged
BRS	L6	8	(1 or 2 or 3) and 4	US-PGPUB; USPAT	4/29/05 16:50	browsed
BRS	L7	29	(1 or 2) and 3	US-PGPUB; USPAT	4/29/05 16:33	browsed
BRS	L8	38	(1 or 2 or 3) and thermometer	US-PGPUB; USPAT	4/29/05 16:51	
BRS	L9	84	(1 or 2 or 3) and (sleeve or thermowell)	US-PGPUB; USPAT	4/29/05 16:51	
BRS	L10	15	(1 or 2 or 3) and (thermowell)	US-PGPUB; USPAT	4/29/05 16:56	
BRS	L11	36	8 not 10	US-PGPUB; USPAT	4/29/05 16:56	browsed
BRS	L12	66	9 not 8 not 10	US-PGPUB; USPAT	4/29/05 17:01	browsed

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4	☐	US 20010047040 A1	US 20010047040	US-PGPub Full	8
5	☐	US 5160456 A	US 5160456	US Full	1
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15	☐	US 4311671 A	US 4311671	US Full	1
16	☐	WO 9202794 A	WO 9202794 A1	Foreign Full	1
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19	☐	US 6453889 B1	US 6453889	US Full	1
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21	☐	US 5775807 A	US 5775807	US Full	1
22	☐	US 5427452 A	US 5427452	US Full	1
23	☐	US 5242226 A	US 5242226	US Full	1
24	☐	US 20020182119 A1	US 20020182119	US-PGPub Full	1

	Comment
1	In the fuel processor, air is combined with anode waste gas or a fuel stream and burned in a burner zone to recover or provide heat to reforming zones which undergo endothermic reactions in the presence of steam to convert at least a portion of the feedstock to hydrogen and carbon monoxide.
2	[0009] The reforming reactions are endothermic and a catalyst containing nickel is often utilized. Partial oxidation (non-catalytic or catalytic) involves sub-stoichiometric combustion of light hydrocarbons such as methane to produce the synthesis gas. The partial oxidation reaction is typically carried out commercially using high purity oxygen.
3	[0031] Second synthesis gas subsystem 16 is preferably a steam reformer, but other substantially endothermic systems for generating synthesis gas (or that benefit from the transfer of thermal energy) may be used.
4	[0045] Referring now to FIG. 3, one illustrative embodiment of a first synthesis gas subsystem 190 is presented. Subsystem 190 includes an autothermal reformer reactor (ATR) 194. Reactor 194 contains an appropriate catalyst, such as a nickel catalyst, as is known in the art.
5	(Empty)
6	steam reforming reaction is ENDOTHERMIC
7	[0009] More recently, partial oxidation processes have been disclosed in which the hydrocarbon gas is contacted with the oxygen-containing gas at high space velocities in the presence of a catalyst such as a metal deposited on a ceramic foam monolith support. The monolith supports are impregnated with a noble metal such as platinum, palladium or rhodium, or other transition metals such as nickel, cobalt, chromium and the like. Typically, these monolith supports are prepared from solid refractory or ceramic materials such as alumina, zirconia, magnesia and the like.
8	[0024] Turning now to FIG. 1, line 20 provides ingress into hydrocarbon conversion reactor means A. Typically, the hydrocarbon conversion reactor means include catalytic steam reforming, autothermal catalytic reforming, catalytic partial oxidation processes and non-catalytic partial oxidation processes. The hydrocarbon stream, steam and the optional oxygen containing gas stream will react within the hydrocarbon conversion reactor means at temperatures of approximately 700.degree. C. to about 1300.degree. C.
9	The reaction temperature was measured with a thermocouple located between the downstream radiation shield and the catalytic monolith.
10	catalyst, e.g., a nickel containing reforming catalyst -- he catalyst used herein may be any conventional steam-reforming catalyst, or autothermal or combined reforming catalyst. Such catalysts can be described as being selected from the group consisting of uranium, Group VII metals, and Group VIII noble and non-noble metals. The metals are generally supported on inorganic refractory oxides similar to the inert materials already described. Preferred catalyst metals are the Group VIII metals, particularly nickel. In the case of nickel, any nickel containing material is useful, e.g., nickel supported on alpha alumina, nickel aluminate materials, nickel oxide, nickel on a rare earth, e.g., La, modified alumina, and preferably a supported nickel containing material. US 5143647 A□TITLE: Synthesis gas generation startup process (C-2556)
11	Green et al. -- sapphire envelope being provided by the thermowell. US-CL-CURRENT: 374/179, 136/230 , 374/141
12	(Empty)
13	IDS
14	FIG. 5, in which 1' represents a hot junction of the thermocouple, 7 a protective insulating tube surrounding the thermocouple, 5 a compensating conductor connected to an element 3 of the thermocouple, 9 a metal fitting, 12 a ceramic coating layer and 13 a catalyst layer. -- also teaches ART RECOGNIZED Equivalent temperature sensor of a THERMISTOR
15	(Empty)
16	(Empty)
17	Instant application
18	common Inventor and assignee
19	(Empty)
20	(Empty)
21	US-CL-CURRENT: 374/143, 136/230 , 374/150 , 374/166 , 374/179 , 374/208 FIELD-OF-SEARCH: 374/179; 374/208 ; 374/166 ; 374/150 ; 374/143 ; 374/148 ; 136/23
22	AIR BAG Deployment
23	A temperature-measuring instrument especially for measuring high temperatures in pressure reactors. It comprises a sheathed thermocouple
24	(Empty)

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26	☐	US 20010046253 A1	US 20010046253	US-PGPub Full	1
27	☐	EP 1469291 A	EP 1469291 A1	Foreign Full	1
28	☐	US 20010055560 A1	US 20010055560	US-PGPub Full	2
29	☐	US 5595719 A	US 5595719	US Full	1
30	☐	US 5245100 A	US 5245100	US Full	1
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33	☐	JP 2004317516 A	JP 2004317516 A	Foreign Full	1
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44	☐	US 5858311 A	US 5858311	US Full	19
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46	☐	US 5752995 A	US 5752995	US Full	2
47	☐	US 5752995 A	US 5752995	US Full	5
48	☐	US 20030172590 A1	US 20030172590	US-PGPub Full	1
49	☐	US 20030172590 A1	US 20030172590	US-PGPub Full	9

	Comment
26	(Empty)
27	EP 1469291A has same priority document
28	The temperature was controlled externally and monitored by a thermocouple on the reactor outside the center of the catalyst bed.
29	To determine the steam reforming activity of the catalysts a stainless steel reactor tube of 8 mm inner diameter was used. The reactor was placed in an electric furnace. Inside the reactor tube a thermocouple was positioned at the bottom of the catalyst bed. The thermocouple was attached to a furnace controller and to a digital temperature indicator.
30	(Empty)
31	The transfer of the acid catalyst is thereby mentioned as an increase of temperature at inlet end 3 measured through thermocouple 26 arranged in inlet end 3.
32	ExOTHERMIC
33	Same Priority Document as instant application
34	US 5192132 A See Search -- US-CL-CURRENT: 374/166, 136/230 , 374/179 , 436/147
35	NAJJAR US 5005986 A US-CL-CURRENT: 374/179, 136/230 , 136/234 , 374/125 , 374/139 , 374/208 , 420/463 , 420/505
36	US 2383729 A Catalyst chamber apparatus has thermocouple in the catalyst bed... US-CL-CURRENT: 422/211, 374/148 , 422/223 , 422/234
37	US 5232517 A See class 136 search US-CL-CURRENT: 136/233, 136/211 , 136/221 , 136/222 , 136/230 , 136/231 , 374/179 , 374/208
38	{of the prior art} carbon deposits on the elements caused by the catalytic property of nickel to crack gas -- Purpose here is to Prevent oxidation and reaction with fuel.
39	Summary of Invention Paragraph - BSTX (9): [0006] Syngas may be produced using a heat exchange reforming ("HER") process. A conventional two-step HER process may use natural gas as feedstock and employs a primary exothermic (or heat-generating) unit producing syngas, e.g. from natural gas and oxygen, coupled with a secondary endothermic (or heat-requiring) unit that uses at least a portion of the heat generated in the primary unit to produce further syngas, e.g. by a reforming reaction of natural gas and steam. In certain HERs, the syngas generated by the HER feeds the primary exothermic unit, while other HERs operate in parallel to the exothermic unit and augment the syngas production therein.
40	According to another aspect of the present invention, the combustor section of the gas turbine may be combined with the first synthesis gas unit, which may be an autothermal reformer or a steam reformer.
41	(Empty)
42	(Empty)
43	(Empty)
44	(Empty)
45	Detailed Description Text - DETX (11): Experiments are made in a tubular reactor fitted with an internal thermowell. The reactor, which is heated in an electrical furnace, is connected with an instrument for measuring the pressure drop across the catalyst bed. The catalyst is charged to the reactor and a layer of Alundum chips is placed above the catalyst to serve as a preheating zone. Water is metered though a calibrated flow meter and vaporized. The gaseous feed is metered separately, preheated and mixed with steam at the reactor inlet. The experiments are conducted at atmospheric pressure. When reduction with hydrogen is carried out, the hydrogen is metered, preheated, and admitted to the reactor. After 2 hours, the hydrogen flow is stopped, and the feed and steam are introduced. During operation the catalyst temperature is measured, and the pressure drop across the catalyst bed is monitored to give an indication whether or not carbon is forming and plugging the bed. The product gas is cooled to remove the unreacted water. The cooled product gas is measured and a sample is taken for analysis.
46	catalyst may be elemental NICKEL, prefered support is ALUMINA (Col. 2)
47	Experiments are made in a tubular reactor fitted with an internal thermowell. T
48	(Empty)
49	[0071] Conversion of the higher hydrocarbon compounds to compounds having one carbon atoms (C.sub.1) using nickel-containing catalytic materials was performed in a fixed-bed, single-pass quartz tubular flow reactor. The reactor unit consisted of a quartz reactor (9 mm.times.11 mm.times.30") with dimples located at 4" from the bottom, a stainless reactor jacket outside the quartz tube, a quartz deadman (3.6 mm.times.8 mm.times.5 inch), and a thermowell jacket (2 mm.times.3 mm.times.27 inch). It was operated in a downflow mode.

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52	☐	US 4822570 A	US 4822570	US Full	2
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55	☐	US 3741713 A	US 3741713	US Full	1
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61	☐	US 4714692 A	US 4714692	US Full	2
62	☐	US 4157338 A	US 4157338	US Full	12

	Comment
50	The thermocouples are mounted in three vertical thermowells spaced 120-degrees apart from each other, such as in thermowell 78, which are located between the wall of the reactor and the downcomer 28.
51	Brief Summary Text - BSTX (7): The prior art thermal sensing apparatus may be considered to include a metallic thermowell mounted on and sealed to the head of the valve. Usually the thermowell has been formed of tantalum and sealed to the head of the valve by a polytetrafluoroethylene (hereafter referred to as PTFE) gasket. A temperature sensor is received in the thermowell tip, and disposed as close as possible to the tip and the batch. The prior art sensing apparatus also includes a metallic (tantalum) tip containing a sensing element, such as an RTD sensor glued or potted in place within the tip. Sensing elements of the latter type have been found to respond very rapidly to a temperature change of the batch being monitored.
52	Brief Summary Text - BSTX (7): The prior art thermal sensing apparatus may be considered to include a metallic thermowell mounted on and sealed to the head of the valve. Usually the thermowell has been formed of tantalum and sealed to the head of the valve by a polytetrafluoroethylene (hereafter referred to as PTFE) gasket. A temperature sensor is received in the thermowell tip, and disposed as close as possible to the tip and the batch. The prior art sensing apparatus also includes a metallic (tantalum) tip containing a sensing element, such as an RTD sensor glued or potted in place within the tip. Sensing elements of the latter type have been found to respond very rapidly to a temperature change of the batch being monitored.
53	In an alternate embodiment, a temperature measuring device 158 is coupled to the oxidant controller 159. The temperature measuring device 158 is adapted to measure the temperature of the reaction products stream (for instance, a thermowell and electronic thermometer may be installed in the effluent stream). The oxidant controller 159 is preferably operable to change the flow rate of the oxidant into the second conduit as a function of the temperature of the reaction products stream. For instance, the oxidant flow rate may be decreased as the reaction products stream increases, and vice versa.
54	In an alternate embodiment, a temperature measuring device 158 is coupled to the oxidant controller 159.
55	Claims Text - CLTX (10): 7. The flare system as in claim 1 in which said temperature sensing means is mounted inside of a thermowell which passes through the sidewall of said stack. Current US Cross Reference Classification - CCXR (1): 422/109
56	Although the reaction zone temperature may be sensed internally, through the use of a suitable thermowell, a more convenient locus is the reaction zone effluent conduit as close to the reaction vessel as possible. This temperature will be virtually the same as the maximum temperature experienced in the reaction vessel as a result of the exothermicity of the alkylation reactions.
57	The catalyst layer was provided with a 3-mm thermowell to measure the temperature thereof.
58	he reactor was 40 centimeters in length and was made from a 3/8 inch OD 304 stainless steel (SS) tube with an annular 1/8 inch OD 304 SS thermowell running the entire length of the bed of catalyst therein.
59	he reactor was 40 centimeters in length and was made from a 3/8 inch OD 304 stainless steel (SS) tube with an annular 1/8 inch OD 304 SS thermowell running the entire length of the bed of catalyst therein.
60	The resulting mixture of catalyst and quartz granules was charged to a copper-jacketed, copper-lined stainless steel reactor tube (net I.D. 0.41 inch, 1.0414 cm), equipped with a copper-jacketed 0.125 inch (0.3040 cm) outside diameter thermowell. This reactor was attached to a flow system by means of "VCR" fittings.
61	A thermowell passed through the center of the reactor.
62	In each run, 5.5 grams of catalyst was placed in a stainless steel reactor (1/2" ID.times.51/2") which was equipped with a thermowell (1/8" OD) in the center of the reactor. Syngas conversion was conducted in a fixed bed reactor in a downflow fashion.

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77	☐	US 4848927 A	US 4848927	US Full	1
78	☐	US 2383729 A	US 2383729	US Full	1
79	☐	US 20040020124 A1	US 20040020124	US-PGPub Full	1

	Comment
63	Temperatures were recorded via an axial thermowell.
64	gasifier
65	(Empty)
66	Gasifiers of type in USPATs 2809104 and 5484554 process carbonaceous fuels (coal petroleum coke gas oil) (synthesis adj gas) (coal adj gas) (reducing adj gas) (fuel adj gas)
67	(Empty)
68	(Empty)
69	(Empty)
70	(Empty)
71	emotely positioning sensing devices within a reactor
72	(Empty)
73	sheath 22 - material not explicit... no coating...
74	metallic sheath 22 encloses thermocouple 18 -- disposed in a well 20
75	metallic sheath 22 encloses thermocouple 18 -- disposed in a well 20
76	(Empty)
77	(Empty)
78	(Empty)
79	Temperature control is important, because if the temperature rises too much, methanation, hydrogen oxidation, or a reverse shift reaction can occur.